

CLAIMS

1. Droplet deposition apparatus comprising:

5 an array of fluid chambers, each chamber communicating with an orifice for droplet ejection, a common fluid inlet manifold and a common fluid outlet manifold; and

10 means for generating a fluid flow into said inlet manifold, though each chamber in said array and into said outlet manifold, said fluid flow through each chamber being sufficient to prevent foreign bodies in the fluid from lodging in the orifice;

15 wherein each chamber is associated with means for effecting droplet ejection from said orifice simultaneously with said fluid flow through the chamber, the resistance to flow of said inlet and outlet manifolds is chosen such that the static pressure at the orifice of any chamber in the array due to the flow varies between any two chambers by an amount less than that which would give rise to significant differences in droplet ejection properties between said two chambers in the array.

20 2. Apparatus according to Claim 1, wherein the inlet manifold has a resistance to flow less than that which would give rise to a variation in static pressure between the inlets to any two chambers in the array sufficient to produce significant differences in droplet ejection properties between said two chambers in the array.

25 3. Apparatus according to Claim 1, wherein the resistance to flow of said outlet manifold is chosen such that the pressure at a fluid inlet to any chamber in the array varies between any two chambers by an amount less than that which would give rise to significant differences in droplet ejection properties
30 between said two chambers in the array.

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4. Droplet deposition apparatus comprising:

an array of fluid chambers, each chamber communicating with an orifice for droplet ejection, a common fluid inlet manifold and a common fluid outlet manifold; and

5 means for generating a fluid flow into the inlet manifold, though each chamber in said array and into said outlet manifold, said fluid flow through each chamber being sufficient to prevent foreign bodies in the fluid from lodging in the orifice;

wherein each chamber is associated with means for effecting droplet ejection from said orifice simultaneously with said fluid flow through the chamber, the resistance to flow of one of said inlet and outlet manifolds being chosen such that the pressure at a fluid inlet to any chamber in the array varies between any two chambers by an amount less than that which would give rise to significant differences in droplet ejection properties between said two chambers in the array.

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20 5. Apparatus according to any preceding claim, wherein the cross-sectional area of at least one of the inlet and outlet manifolds is such that said pressure varies between any two chambers by an amount less than that which would give rise to significant differences in droplet ejection properties between said two chambers in the array.

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25 6. Apparatus according to any preceding claim, wherein the array of chambers is linear.

30 7. Apparatus according to any preceding claim, wherein said array is angled to the horizontal and said inlet manifold extends parallel to the array, the properties of said inlet manifold varying in a direction lying parallel to the array in such a way as to substantially match the rate of pressure loss along the inlet manifold due to viscous losses in the inlet manifold to the rate of increase of static pressure along the inlet manifold due to gravity.

8. Droplet deposition apparatus comprising:

an array of droplet fluid chambers angled to the horizontal, each chamber being supplied with droplet fluid from a common fluid manifold extending parallel to the array; and

5 means for generating a fluid flow into each chamber of the array;

wherein properties of said inlet manifold varying in a direction lying parallel to the array in such a way as to substantially match the rate of pressure loss along the manifold due to viscous losses in the manifold to the rate of increase of static pressure along the manifold due to gravity.

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9. Apparatus according to Claim 8, wherein the cross-sectional area of said inlet manifold varies perpendicular to the longitudinal direction of said array of chambers.

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10. Apparatus according to Claim 8 or Claim 9, comprising a common fluid outlet manifold for said array of chambers.

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11. Apparatus according to Claim 10, wherein the cross-sectional area of said outlet manifold varies perpendicular to the longitudinal direction of said array of chambers.

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12. Apparatus according to Claim 10 or Claim 11, comprising means for generating a fluid flow into said common fluid manifold, through each chamber in the array and into said common fluid outlet manifold.

13. Apparatus according to any of Claims 8 to 12 wherein said array is arranged substantially vertically.

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14. Droplet deposition apparatus comprising:

at least one droplet fluid chamber communicating with a first fluid reservoir located above said at least one chamber and with a second fluid reservoir located below the chamber;

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pump means for conveying fluid from the second fluid reservoir to the first fluid reservoir; and

means for preventing the flow of fluid from the first to the second fluid reservoir when said pump means is not operating.

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15. Apparatus according to Claim 14, comprising pump control means for controlling said pump means in dependence on the fluid level in said first fluid reservoir.

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16. Droplet deposition apparatus comprising:

at least one droplet fluid chamber communicating with a first fluid reservoir located above said at least one chamber and with a second fluid reservoir located below the chamber;

pump means for conveying fluid from the second fluid reservoir to the first fluid reservoir; and

pump control means for controlling said pump in dependence on the fluid level in said first fluid reservoir.

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~~17. Apparatus according to Claim 15 or Claim 16, wherein said pump control means comprises a fluid level sensor located in said first fluid reservoir and is adapted to control said pump means in dependence on an output from said fluid level sensor.~~

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18. Apparatus according to any of Claims 14 to 17, comprising temperature control means for controlling the temperature of fluid conveyed from the second fluid reservoir to the first fluid reservoir.

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19. Droplet deposition apparatus comprising:

at least one droplet fluid chamber communicating with a first fluid reservoir located above said at least one chamber and with a second fluid reservoir located below the chamber;

means for conveying fluid from the second fluid reservoir to the first fluid

reservoir; and

temperature control means for controlling the temperature of fluid conveyed from the second fluid reservoir to the first fluid reservoir.

5 20. Apparatus according to Claim 18 or Claim 19, wherein said temperature control means comprises means for reducing the temperature of fluid conveyed from said at least one chamber to the first fluid reservoir.

10 21. Apparatus according to any of Claims 18 to 20, comprising a conduit for conveying fluid from the first fluid reservoir to said at least one droplet fluid chamber, said temperature control means comprising a temperature sensor located in said conduit and being adapted to control the temperature of fluid conveyed from the second fluid reservoir to the first fluid reservoir depending on an output from said temperature sensor.

15 22. Apparatus according to any of Claims 14 to 21, comprising means for conveying fluid from said first fluid reservoir to said second fluid reservoir when the fluid level in said first fluid reservoir exceeds a given level.

20 23. Droplet deposition apparatus comprising:

at least one droplet fluid chamber communicating with a first fluid reservoir located above said at least one chamber and with a second fluid reservoir located below the chamber;

25 means for conveying fluid from the second fluid reservoir to the first fluid reservoir; and

means for conveying fluid from said first fluid reservoir to said second fluid reservoir when the fluid level in said first fluid reservoir exceeds a given level.

30 24. Apparatus according to Claim 22 or Claim 23 wherein said means for conveying fluid from said first fluid reservoir to said second fluid reservoir comprises a conduit extending between said first and second reservoirs and

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having an inlet in said first fluid reservoir above said given level.

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25. Apparatus according to any of Claims 14 to 24, comprising means for supplying fluid to said second fluid reservoir, and fluid supply control means for controlling the supply of the fluid to said second fluid reservoir depending on the fluid level in said second fluid reservoir.

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26. Droplet deposition apparatus comprising:
at least one droplet fluid chamber communicating with a first fluid reservoir located above said at least one chamber and with a second fluid reservoir located below the chamber;
means for conveying fluid from the second fluid reservoir to the first fluid reservoir;
means for supplying fluid to said second fluid reservoir; and
fluid supply control means for controlling the supply of the fluid to said second fluid reservoir depending on the fluid level in said second fluid reservoir.

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27. Apparatus according to Claim 25 or Claim 26, wherein said fluid supply control means comprises a fluid level sensor located in said second fluid reservoir and is adapted to control the supply of fluid to said second fluid reservoir in dependence on an output from said fluid level sensor.

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28. Apparatus according to any of Claims 14 to 27, comprising a third fluid reservoir communicating with said second fluid reservoir, and means for conveying fluid from said third reservoir to said second reservoir in dependence on the fluid level in said second fluid reservoir.

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29. Droplet deposition apparatus comprising:
at least one droplet fluid chamber communicating with a first fluid reservoir located above said at least one chamber and with a second fluid reservoir located below the chamber;

means for conveying fluid from the second fluid reservoir to the first fluid reservoir;

a third fluid reservoir communicating with said second fluid reservoir;
and

5 means for conveying fluid from said third reservoir to said second reservoir in dependence on the fluid level in said second fluid reservoir.

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10 30. ~~Apparatus according to any of Claims 14 to 29, comprising means for conveying fluid from said second fluid reservoir to said at least one droplet fluid chamber.~~

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15 31. Droplet deposition apparatus comprising:
at least one droplet fluid chamber communicating with a first fluid reservoir located above said at least one chamber and with a second fluid reservoir located below the chamber;
pump means for conveying fluid from the second fluid reservoir to the first fluid reservoir, and from said second fluid reservoir to said at least one droplet fluid chamber.

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20 32. ~~Apparatus according to Claim 30 or Claim 31, comprising means for diverting the conveyance of fluid away from said first fluid reservoir to said at least one droplet fluid chamber.~~

25 33. Apparatus according to any of Claims 14 to 32, wherein the or each chamber comprises a channel connected to said first and second fluid reservoirs at respective ends thereof, and to a nozzle for droplet ejection at a point intermediate said respective ends.

30 34. Apparatus as claimed in claim 33 comprising means connected between the respective ends of the channel for bypassing fluid flow around the channel.

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